

CHAPTER 4: THE PRE-MANAGEMENT ERA (HISTORY OF THE KRUGER NATIONAL PARK ELEPHANT POPULATION UP TO 1966)

INTRODUCTION

Various reports have been written on the history of elephants in South Africa (Bryden 1903; Ebedes *et al.* 1991; Hall-Martin 1992). van Wyk & Fairall (1969), gave a brief summary of the history of the elephants in Kruger National Park (KNP) but as yet no specific investigation into the history of the population of the Lowveld area of RSA (including the KNP) has been undertaken. This chapter gives a detailed history of the KNP population and has been divided into three phases - prior to the arrival of the Europeans, post arrival of the Europeans, and post proclamation of the area as a game reserve/national park up to the time that elephant management was initiated.

Earlier authors have suggested that in the past elephants occurred in the KNP area in considerable numbers (Rowland-Jones 1955; Pienaar 1990; 1996), but the interpretation of all of the information gained for this study suggest that numbers of elephants in this part of Africa have perhaps always been low, though the reasons for this are somewhat obscure.

MATERIALS AND METHODS

Data and information presented are entirely from a literature survey which included books, scientific literature, unpublished reports, annual reports from KNP, and diaries of earlier Wardens and Rangers.

Quotes in italics were translated by me from Afrikaans to English.

HISTORY PRIOR TO THE ARRIVAL OF EUROPEANS

Prehistory

Of the many forms of Proboscidae which evolved world wide, not all have been recorded in Africa (Shoshani 1991). Eloff (1990a) speculated that "*other types of elephants*" could have occurred in the KNP area as recently as 200 000 years ago, but there are no fossil records to substantiate this.

The San (Bushman) era

Stone artifacts found over most of the KNP show that people were living in the KNP area during the Early, Middle and Later Stone Ages between 7 000 BC to 300 AD (Eloff 1990a; 1990b). The San (Bushman), whose characteristic rock paintings are still visible in rock shelters in both the south-western and northern areas of the KNP, were associated with the latter part of the Late Stone Age between 7 000 BC and 300 AD (Cooke 1969). Elephants may have occurred in the area as there are three known paintings in rock shelters in the KNP. One of these in a rock shelter along the Nwatindlopfu River shows a group of five of these animals (English 1990). It may be expected that a large and dangerous animal like the elephant which, if it could be killed, would feature prominently in Bushman folk lore. Woodhouse (1992, 1996) suggested that elephants were a popular theme for paintings as they "provided a lot of meat and were associated with water and rain which the Bushmen artists were keen to influence".

It is now also widely accepted that San paintings depict the spiritual experiences of shamans (ritual specialists) during trances (states of altered consciousness) induced by ritual dances (Lewis-Williams 1996; Lewis-Williams & Dowson 1989). These authors suggest that San art was not narrative of their lifestyles nor "menus" representative of their diet, and that the incidence of different species in their art may not be reflective of their relative abundance. However, if elephants were popular elsewhere as artistic subjects (Lewis-Williams & Dowson 1989) and were "associated with water and rain which the Bushmen artists were keen to influence" (Woodhouse 1992, 1996), then it is perhaps still significant that they are such a rare feature of the San art in KNP. Of the 109 shelters with rock art located in the KNP thus far, there are only three paintings showing elephant. One other shelter with elephant paintings has been found in the Brondal area, some 30 kms to the west of the KNP between Nelspruit and White River (Bornman 1995). The relative scarcity of elephants in the rock art of the KNP and surrounding area suggests that these animals were rare during the San era.

The arrival of the Bantu

During the period ca. 200 to 500 AD immigrants with small herds of domestic stock, ceramic traditions and a knowledge of iron working penetrated the area (Joubert 1986). From this era, Plug (1984; 1989) reported on archaeozoological remains from 12 sites in the KNP. Only one of these

sites (Tsh 1 on the Mutlumuvi River near Tshokwane) contained elephant remains. The date for this site was estimated at about 510 AD. This scarcity of elephant remains may however bear no relation to the numbers of elephants. Usually, only the meat and tusks would have been carried back to dwellings as the other remains (bones and hides) would have been too heavy, and have no known cultural value to these people.

The impacts that any of these people may have had on whatever elephants populated the area during those times is entirely unknown. An archaeological site known as Schroda, situated near the Limpopo River approximately 200 km to the west of the KNP, rendered "large quantities" of ivory in conjunction with cowries, suggesting a participation in the ivory trade (Plug & Voigt 1985). The ages of the remains at Schroda were estimated as originating between the eighth and ninth centuries by ^{14}C dating. These authors concluded that the presence of glass beads at this site strengthened the evidence for their link with the coastal trade during the eighth century.

Between circa 900 and 1220 AD trade in gold and ivory became established on an increasing scale between the indigenous people inhabiting the Limpopo River area and the Islamic empire, and centres of trade became established at Bambandyanalo and Mapungubwe. The "golden age" of Mapungubwe lasted until circa 1290, but the virtual absence of ivory from Mapungubwe combined with the presence of gold in the uppermost levels (of the excavation) suggests that by the 12th century, the trade had switched to gold and the trade routes had moved farther north leaving the Limpopo valley a virtual backwater (Plug & Voigt 1985). Could this switch to gold, the lack of ivory in the archaeological sites, and the shift in trade routes perhaps have been due to a paucity of elephants?

Great Zimbabwe then grew in importance as a centre of trade and culture (Plug & Voigt 1985). This era lasted for approximately 100 years when, upon the decline of Great Zimbabwe in 1420, some of the people moved south and established themselves in the northern KNP at Thula Mela, Makahane, Matjigwili (Mashikiri) and also in a chain of stone wall villages on hill tops from Thula Mela westwards towards Messina and beyond (Eloff 1966; Küsel 1992). These sites were inhabited from the 15th to the early 19th centuries. Another archaeological site (Sh 16 near Red Rocks in the Shingwedzi area) reported on by Plug (1984) also contained elephant remains.

This site was dated at between AD 1500 - 1900.

The Portuguese established trade with south-east Africa in the early 1500's (Smith 1970). He wrote that in 1544 they (the Portuguese) "reported that 'great quantities' (of ivory) could be obtained at Delagoa Bay, but that by 1680 the English had bought up all the supplies reaching this port, so that there was 'virtually none left in the country'". Unfortunately, quantities of ivory were not given, and subjective statements like "great quantities" give no indication of how much ivory this may have been. Also, there is no indication of where the ivory might have come from. Some of this ivory may have come from the KNP area, as Delagoa Bay was the closest port.

Alpers (1975) was of the opinion that the technology of elephant hunting only became dominated by firearms from the middle of the nineteenth century, but that there was evidence of their use a century before this in Mozambique. While it is known that prior to this the indigenous Africans were capable of killing elephants (Alpers 1975), it is not known what sort of impacts they may have had on the elephant populations. According to Alpers, the methods used were to dig deep pits, plunging heavy spears between the shoulder blades from tree-perches, and severing the tendons in the elephant's leg using a wide-edged axe. It would seem unlikely that these means that they had at their disposal would allow them to significantly reduce elephant population numbers, but it may be that the mere presence of humans capable of hunting elephants was enough to keep their numbers low. Whyte *et al.* (1998; see Chapter 6) estimated that the selective removal of as few as between 3-6% of the population could be sufficient to stabilise it.

There is some evidence from the population structure of baobab trees in the northern KNP that people may have had some influence on numbers of elephant (Whyte *et al.* 1996; see Chapter 3). Elephant densities were possibly low at this time as a result of this human presence and their trade in gold and ivory, which in turn could have resulted in an increased survival of baobabs (Whyte *et al.* 1996). This conclusion was drawn from the fact that damage to bark of baobabs remains visible for a very long time. Some early European visitors who were in the KNP area carved their names with dates on these trees. On one such baobab in the Tsumaneni Spruit near Bangu in the KNP, is carved: "BRISCOE 1890". This carving, now 110 years old, is still as clearly visible. If elephants

were utilising baobabs 100 or even 200 years or more ago, it could be expected that the scars would still be clearly visible. Yet 50% of the trees in the northern KNP show no damage at all, and the damage to those that have been utilised is reasonably new.

Another possible point of significance in the discussion of the history of elephants in KNP is the wide diversity of plant taxa still extant in the KNP. Elephants are known to eliminate some plant species in areas where they occur at high densities for extended periods of time (e.g. Leuthold 1977; Page 1999). According to Waithaka (pers.comm.¹), Amboseli National Park in Kenya has lost more than 50% of the plant species that occurred there due to the high densities of elephants. The near eradication of baobabs from Tsavo National Park in a short period of time (Leuthold 1977) and the fact that they are still abundant in northern KNP (the southern tip of their range in Africa) indicates that in KNP, elephants could never have achieved the densities they did in Tsavo. The herbarium list in Skukuza records 1 982 taxa for the KNP (Zambatis 1997e) and there is no evidence of any species lost from KNP, but the eradication of the stands of aloes (*Aloe marlothi*) from the Doispans and Sabie River areas of the KNP in 1959 (see Biologiese Afdeling (1959) below) is evidence of their potential impacts on species diversity even at low densities. This plant diversity of KNP is thus suggestive of an area with a long history of low densities of elephants.

Post colonisation (arrival of the Europeans)

The first writings on the area now known as the KNP come from the diaries of Francois de Cuiper. In 1721 the Dutch "Verenigde Oos-Indiese Compagnie" (V.O.C.) established a base in Delagoa Bay through which it was hoped to establish an "ivory and gold trade with Monomotapa" (Punt 1990). In 1725 de Cuiper and his party of 31 undertook an expedition into the interior to reconnoitre a trade route to Zimbabwe. They marched to the north-west to the Matola River which they named the "Olifants" because "the Matola area was the home of large herds of elephants" (Punt 1990). This is only about 70 km from the present KNP boundary and is the only mention made of elephants on this expedition. These men penetrated the extreme south-eastern region of the KNP area which, according to his account, was well populated by black people as they passed through several villages situated about one day's march apart. They enquired of the road to "Ciremandelle" (Phalaborwa) and Thowelle (Zimbabwe) from these people and were informed that

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at Ciremandelle there was little gold but much copper and that at Simangale in the Thowelle area, there was much gold, copper and ivory (Punt 1990). However, due to the hostile attitude of these people, which ended in a skirmish, the party was forced to retreat and return to Delagoa Bay.

It is of interest that the immediate interior, including the KNP area, were not perceived by these indigenous people as an "ivory area" but that ivory was plentiful in Zimbabwe. This suggests a low density of elephants in the KNP area at that time.

Much later, in 1838, Louis Trichardt crossed the KNP area on his trek from the Soutpansberg to Lorenzo Marques (Preller 1917). The only mention of elephants in Trichardt's diaries was of a hunt in May 1837 in the Soutpansberg area, and of an unsuccessful hunt on 28 April 1838, after their arrival in Lorenzo Marques. Neither of these hunts occurred in the KNP area and no other mention was made of these animals. Had opportunity presented itself, they would almost certainly have hunted the elephants and he would have recorded the incidents in his diaries. It may be assumed that elephants were uncommon there at that time also.

João Albasini was the first white settler in the KNP area. Based on Pienaar (1990) Albasini arrived in Delagoa Bay in 1831 and established himself as a hunter and trader in Mozambique and the eastern Transvaal. Initially he traded ivory from Lorenzo Marques and in 1841 he formed a company with nine others, who would, "... by common agreement ... shoot elephants in the territories neighbouring this garrison ...". The company's only objective was to "... increase the ivory trade which is today so diminished by the Negroes of the interior...". Twenty-five people were employed solely to shoot elephants. It is not known how successful this venture was or where these elephants were to be shot, but six months later Albasini parted ways with the Company. He then established himself in the Phabeni area in the southern KNP where he reputedly also traded in, among other things, ivory. After two years there he abandoned the store and moved to Ohrigstad, Lydenburg and finally in 1853 to the Soutpansberg in the northern Transvaal. Although it is nowhere stated as such, the outcome of all of these ventures hint of an elephant population at too low a density to sustain viable hunting and trade.

Rowland-Jones (1955) was not entirely in agreement with this. In his own words:

"I have, for many years, interested myself in the gradual rehabilitation of the elephant in the Park, and I have taken every opportunity of trying to ascertain the position as it was at the beginning of the century.

"In the North, European hunters and recruiters and old natives born in that country all confirm that no elephant were to be found and the ivory hunters had left the district long before that. Col. Stevenson-Hamilton and his rangers found the same thing to be the case in the old Sabie Game Reserve - the elephant had been annihilated long before their arrival in the Lowveld.

"The reason for this is not hard to find. One Albasini, a Portuguese trader, appointed himself head of the Shangaan tribe and setting up his headquarters on the Sabie River sent out his hunters to scour the country for ivory. Their methods were so effective that in time no elephant survived in the old Sabie Game Reserve, so Albasini had to move to new pastures. The whole Tribe migrated to the Zoutpansberg district, setting up their headquarters in the Groot Spelonken from where the hunters moved down into the Lowveld and combed the countryside from the Klein Letaba to the Limpopo even penetrating far into Portuguese Territory. This locust-like invasion finally reduced this area to the same state as the Sabie.

"One area of the Park, the portion between the Letaba and the Olifants rivers lying approximately half-way between Pretorius Kop and Spelonken appears to have missed this devastation and a small nucleus of elephant survived in this local Mesopotamia.

"In 1910 the Willis Brothers trekked through Punda Maria to Malonga and the first elephant spoor which they found was 70 miles east of the Limpopo, nearly at the Great Save River, so the devastation had been pretty complete".

In 1853 the town Schoemansdal near the Soutpansberg was described as the elephant hunters' Mecca which thrived between 1846 and 1867 (Pienaar 1990). When German traveller Carl Mauch visited that area in 1871 he wrote, "... 25 years ago (1846?) the killing of elephants was very productive and the profit enormous ..." but by 1871, "... elephant hunting was no longer practical ...

too expensive" (Burke 1969).

By 1897 Millais (1899), when visiting the Schoemansdal area, wrote, "Two days ago we caught up with the De Mervelles, the Basadanotes, and Daniel Erasmus, who are among the few Dutch hunters who now trek every year from the Transvaal to the northern hunting-grounds; for now that the elephants are nearly gone, hunting affords but a poor and precarious mode of existence, and all those poor fellows are, like Van Staden, on the verge of beggary".

Bernard Lotrie was one of the more active hunters of the time in Schoemansdal (Moerschell 1912) who fell upon hard times on the collapse of elephant hunting. As with the other hunters of the time it is unclear where he conducted his hunts. Pienaar (1990) concluded that it was mainly to the north in Zimbabwe and Mozambique. There is evidence however, that he had been in the KNP area from a carving in a baobab tree near Malonga Fountain which reads, "*B L 60*" which may be construed as "Bernard Lotrie 1860" (Pienaar 1990). From what has been quoted above, it is certain that by that time (and probably for many years before) not many elephants would have been present in the area, these hunters were shooting their elephants well to the north of the Limpopo River.

Regular hunting parties started to exploit the KNP area only from about 1870. Elephants still apparently occurred in the KNP area around 1880, but by 1896 these were no longer to be found there. In this regard Vaughn Kirby (1896) wrote, "I can well remember how 14 years ago the eastern portion of the Transvaal was a perfect paradise for big game of all descriptions - elephant, rhinoceros, hippopotami, buffalo, giraffe, roan and sable antelope, and in fact all the species of antelope peculiar to those regions. Now, alas! We speak of all of these animals, with the exception of giraffe and sable antelope, as we do of the deinotherium, megatherium and the dodo - things that have been". In this text he also wrote, "As lately as five years ago there were elephants on the Timbavati, a herd of 50 head being encountered by some boer hunters. They came from the extensive reed beds at the junction of the Letaba and Oliphants (*sic*) rivers, though they still exist in the dense bush on the slopes of the Libombo (*sic*)".

Sandeman (1880) visited the KNP area to the south of the Sabie River in 1878 but made no mention at all of elephants.

Glynn (undated), one of the few Lowveld pioneers who wrote of his experiences during the period 1873 - 1925, hunted extensively in the region, but speaks only of elephant hunting along the Pungwe River (much further to north in Mozambique). This suggests that elephants were already extremely scarce during that time.

In his chronicle of the decline of the elephant populations of southern Africa, Bryden (1903) gives specific accounts of many hunters and the areas in which they operated. He makes no mention at all of the Lowveld as an area where elephants were hunted.

“Bvekenya” Barnard hunted (poached) elephants from a base camp known as “Crooks’ Corner” between 1910 and 1929 (Bulpin 1954). Crooks’ Corner was situated just south of the Limpopo River in what is now part of KNP. No elephants occurred here however, and his hunting (and other poachers of the time) was conducted to the north in Rhodesia (Zimbabwe) and Mozambique.

It seems likely that the remnants of the population of elephants inhabiting what is now the KNP were shot to extinction between 1880 and 1896 by early European and Boer hunters, assisted by their African employees, none of whom kept records of their hunts.

There is thus no written record of the number of elephants which may have inhabited the KNP area prior to the arrival of Europeans, nor the amount of ivory which may have come from the area. It is perhaps significant that none of the hunters who left any record (e.g. Selous 1881; Finaughty 1916) hunted elephants in the KNP area. Those that did hunt there (Vaughn Kirby 1896; Glynn undated), did not shoot any elephants. This, along with the evidence from baobabs (Whyte *et al.* 1996; see Chapter 3), suggest that elephants occurred at relatively low densities, even during the Mapungubwe era around 900 AD.

Based on historical information from the San era through the Bantu colonisation era, the baobab record, and up until the arrival of literate white hunters, I conclude that elephants did not occur in large numbers in the KNP area. Elephants that did occur here at the time of the arrival of the white man and his firearms, were extirpated by them before the proclamation of the Sabie Game Reserve at the beginning of the century.

Post proclamation as a game reserve in 1898

As an introduction to this era, the boundary changes to the KNP have been summarised in Table 3 and Figure 9. Although the Sabie Game Reserve was initially proclaimed in 1898, Colonel James Stevenson-Hamilton arrived as first resident Warden of the Sabie Game Reserve only in July 1902. His initial conclusion was that there were no elephants (Stevenson-Hamilton 1903a; 1903b). By 1905 spoor had been found of a few elephants near the confluence of the Letaba and Olifants rivers after which a steady increase in numbers was noted.

Table 3: Area and boundary changes to the Kruger National Park from 1898 to 1994.

Region (see Figure 9)	Name of area	Comments	Size (ha)	Total size of KNP (ha)
F	Sabie Game Reserve	Proclaimed as a game reserve in 1898	368 200	368 200
H+E	Private farms	Control of private farms was passed to KNP Warden in 1902/3	942 600	1 310 800
A+B+G	Shingwedzi Game Reserve	Proclaimed as a game reserve in 1903	851 300	2 162 100
I	Nsikazi west	Added to KNP in 1906	60 000	2 222 100
A	Pafuri	Excised in 1913	20 700	2 201 400
D	Letaba/Olifants (1)	Added in 1914	92 100	2 293 500
I	Nsikazi west	Excised in 1923	60 000	2 233 500
B+C+D+E+F+G	Kruger National Park	Proclaimed as a National Park in 1926 (Area C added, Area H excised)	1 948 500	1 948 500
G	"Shingwedzi block"	Excised in 1969 in exchange for Area A (Pafuri)	20 700	1 948 500
A	Pafuri	Added in 1969 in exchange for Area G ("Shingwedzi block")	20 700	

The following accounts have been drawn from reports of the Park's Wardens and reflect the population growth since that time.

(Stevenson-Hamilton 1903a). "Elephants existed in fairly large numbers up to forty years ago in the Sabie Bush, but as there are no herds in any way adjacent I see no prospect of their returning to the Sabie Game Reserve".

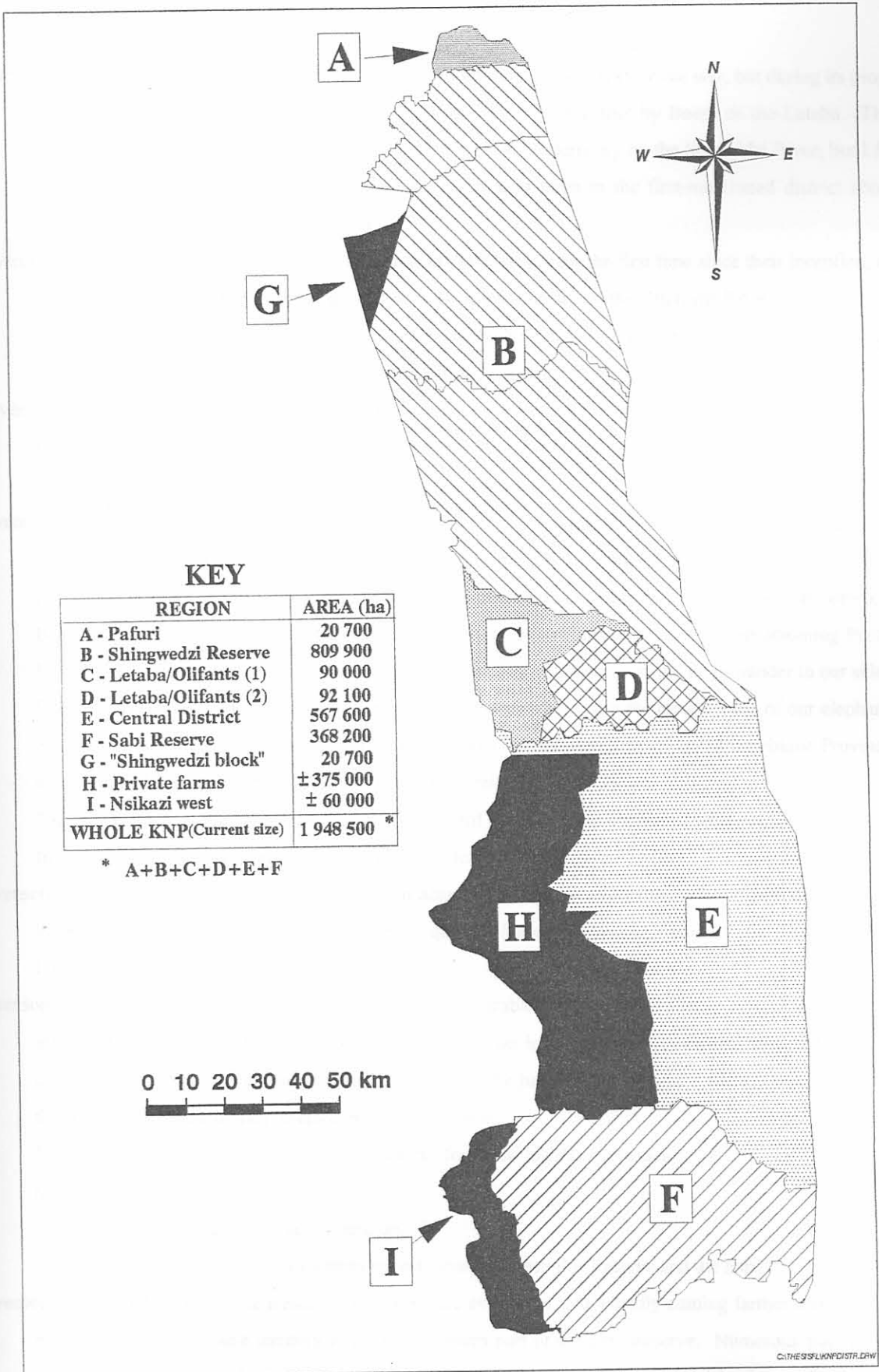


Figure 9: Historical area and boundary changes in the Kruger National Park since its proclamation in 1903 (see Table 3).

- (Stevenson-Hamilton 1903b). "Elephants have not crossed into the Transvaal since the war, but during its progress a herd came in from Portuguese territory and eight of them were shot by Boers on the Letaba. This was about the whole herd. There are still a few left in Portuguese territory on the Singwidsi River, but I fear we have seen the last of them in the Transvaal. Boers shot three in the first-mentioned district about two months ago (i.e. in Portuguese territory)".
- (Stevenson-Hamilton 1905). "Elephants have appeared in the Reserves for the first time since their inception, coming from Portuguese Territory: four near the Singwitsi River, and six on the Oliphants River. It is quite possible that, finding themselves undisturbed, these animals may be induced to remain". (These animals may well be the remnants of the herd referred to by Vaughn Kirby (1896) - see above).
- (Stevenson-Hamilton 1906-1907). "Elephants have very tentatively begun to make their appearance in some of their old haunts, but are evidently as yet by no means sure of their welcome. Fortunately, there are still a considerable number in the thick bush over the Portuguese border".
- (Stevenson-Hamilton 1909a). "The facts were as follows: In 1902 a small Reserve (about 1 400 square miles) was declared in the Barberton District (Sabi Reserve). The following year, Government decided to proclaim as a Reserve practically all the country bordering the Portuguese border up to Rhodesia (Singwitsi Reserve), which, being a country well stocked with game would serve as a good "feeder" country from adjoining Portuguese East Africa. The natives all having guns there, the tendency of the game would be to wander to our side. This forecast has, indeed, since been fully borne out by results, and we owe the recuperation of our elephants, our elands, and possibly, in the extreme north, of our rhinos, to the contiguity of the Mozambique Province. The area so included comprised about 12 thousand square miles.
- "At present there is permanently in the Reserve a herd of some thirty elephants, which originally crossed over from Portuguese territory, but now seldom, if ever, leave the Reserve".
- (Stevenson-Hamilton 1911). "I was not successful in actually seeing any elephants during my annual tour this year though I spent some time in the district they frequent in hopes of doing so. Tracks were, however, fresh and fairly numerous".
- (Stevenson-Hamilton 1912). "Major Fraser reports that considerable numbers of elephants have of late been coming into the Reserve from Portuguese territory consequent on hunting by natives on that side of the border. A considerable number were present during August near the junction of the Letaba and Olifants Rivers, both in the two Reserves and in the protected area between them.
- "I think, however, that the following, allowing for unavoidable inaccuracies, gives a fair estimate, of the numbers as they stand at present:-
- Sabi Reserve: "Elephant (migratory): 25
- Singwidsi Reserve: "Elephants are migratory between this Reserve and the Sabi".
- (Stevenson-Hamilton 1913). "Sabi Reserve. Elephants are every year undoubtedly coming farther and in increasing numbers from Portuguese territory in the north-eastern part of the Sabi Reserve. Numerous tracks were this year found everywhere along the Olifants River as far as the Imbabate junction and for four or five miles south of the former river. The state of the bush within this area shows it to have become a permanent feeding

ground. By day, however, the elephants usually retire to the Lebombo Hills, or seek the shelter of a large and dense bush not far from the boundary. They cross the Olifants freely and wander all over the protected area for a distance of at least twenty miles from the Portuguese border.

"Singwitzi Reserve. Elephants are much more numerous than in the Sabi. The herds crossing from Portuguese territory wander the whole length of the Lebombo between the Letaba and Limpopo Rivers and also travel up the former river for a distance of forty miles or more from the boundary, sometimes crossing into the protected area".

(Stevenson-Hamilton 1914). "Singwitzi Reserve. The Elephants have been seen as far in as 40 miles west of the Lebombo, and as they are not interfered with I have no doubt they will forsake Portuguese Territory and make their permanent home in the Game Reserve".

(Stevenson-Hamilton 1920). "Sabi Reserve. These are such very slowly breeding animals that no striking increase is apparent. Their tendency however seems to be to live less in Portuguese territory and more in the Transvaal than formerly. They now wander, during the wet season especially, long distances into the Game Reserve, especially along the Olifants River and to the south of it near the Border.

"Shingwedzi Reserve. The same herd that is found near the Olifants River frequents the southern part of the Shingwedzi Reserve and appears on the whole to spend the greater part of its time therein".

(Stevenson-Hamilton 1924). "Twenty years ago the elephant was extinct in the Transvaal; but a good many still remaining across the border in Portuguese territory small parties gradually filtered back, until now we possess several herds of quite respectable dimensions, and somewhat embarrassing confidence".

(Stevenson-Hamilton 1925). "There are now two main herds permanently located within the Reserve in the neighbourhood of the Letaba and Tendi River, and they extend their wanderings to the north as far as the Shingwedzi, and south as far as the Olifants Rivers. In addition, a good many of the species, scared by the shooting which has been taking place on Portuguese Territory, have been migrating thence into the Reserve between the Shingwedzi and Limpopo Rivers, and were there encountered by the Government survey party, during the latter part of the year".

(Stevenson-Hamilton 1930). "Elephants have caused so much damage to native crops on the Letaba that the people of Knaba have had to be moved to a point some distance south of that river. These animals have also done some damage to the Olifants pontoon by breaking the wire cable stays, and have attempted to interfere with the cable itself. The animals which wander south to the Olifants River are invariably bulls, either singly or two or three together. The breeding herd is very local and seldom moves from its portion on the Letaba west of the Tendi Junction".

(Rowland-Jones 1955). "I have, for many years, interested myself in the gradual rehabilitation of the elephant in the Park, and I have taken every opportunity of trying to ascertain the position as it was at the beginning of the century.

"In 1931 one elephant made its appearance on the Pongola River and the natives informed me that this was spooed back to Malonga and was in fact the first scout to enter the northern area from Portuguese Territory. The following year a few elephant could be found at Malonga and ten miles further south at Wambia pans, but

no other infiltrations occurred in other parts of the Park.

"This leads me to believe that the present population is derived from two sources; south of the Shingwidzi River the increase and gradual spread of the breeding herd at Letaba and to the north a small influx of elephant from Portuguese Territory through Malonga and Wambia.

(Stevenson-Hamilton 1931). "Elephants in small parties of bulls only, come south of the Olifants River in the east part of the section during the late summer and early autumn months in search of marula fruit. In the western part of the section near the Mklasiri River (the boundary) portions of main herds are however more or less permanently found. There is no doubt that the tendency of all the elephants is to move gradually westwards, where the country is richer and probably they will continue to do this until they come up against occupied land. "Elephants (small parties of bulls) frequent the lower Letaba finding resting places in the islands in the river and they also wander across to the Olifants. The breeding herds are found higher up about 20-30 miles above the ranger's station. The latter has several times encountered considerable herds while on patrol, and when guiding the Schomburg filming expedition, he was able to bring them up to two sections of the herd - one of 60 and the other of 30 with a number of small calves. It seems certain however that the elephants generally still migrate periodically into Portuguese Territory at certain seasons of the year where no doubt a few get killed from time to time, although fortunately there is no considerable native population in that area of the Portuguese border.

"Elephants have recently come into the section (Punda), though at present they do not appear to remain in it permanently".

(Stevenson-Hamilton 1932). "It is now definitely established that there are three main breeding herds in the northern portion of the Park, aggregating probably not less than 150 animals in addition to which there are various small parties of unattached males moving about. The breeding herds keep as a rule to the west of the Tende River and like to wander far up the Letaba, this having no doubt in former days been their favourite area. A herd has in fact been known to go as far as the Mklasiri River which is far to the west of the Park. I think the tendency of the herds is to migrate less and less into Portuguese Territory annually, as they find themselves undisturbed in the Park. Detached bulls have been seen on several occasions between the Letaba and Olifants Rivers, and small parties of them have been noticed by visitors drinking etc. at the Letaba opposite to the Camp".

(Stevenson-Hamilton 1933). "It is now known that there are five separate breeding herds, Ranger Crous having discovered the existence of two others along the Olifants River. The total number of animals in the Park cannot be less than 200. The herds from the Olifants wander west and south, and have been seen a long way outside the Park and well up the Klasiri River. The herds on the Letaba largely confine themselves to the immense reed beds found in that river, and the tendency is less to leave the Park for incursions into P.E.A. than it was formerly. During the marula - March and early April - all elephants are less static and wander far from their usual feeding grounds. Individuals and small groups, have been seen as far north as the Shingwedzi and also in the extreme east of No. 8 section".

(Stevenson-Hamilton 1934). "There is a gratifying and very noticeable increase among these animals, as well as a tendency to spread away from their favourite fastnesses among the reed beds of the Letaba River. Individuals

have been located less than 20 miles from Punda Maria on the main road to the south, which may either have come thence, or from the Portuguese Territory to the east. The bulls in small groups or singly have always been prone to wander, but in September the ranger of No. 6 Section encountered a considerable herd of cows and young calves on the main road just south of the Letaba causeway. Elephants were seen on Klasiri Mond, the extreme western corner of the Park south of the Olifants River in July, and they wander a long way up the Klasiri especially in summer. The rangers of Nos. 6, 7 and 8 Sections have all reported elephants in their sections and a large number of calves".

(Stevenson-Hamilton 1935). "This species is certainly increasing in the Park both in numbers and in extent of range. It seems now definitely established in No. 8 section. Parties of bulls, and even cows with calves have been seen close to Letaba".

(Stevenson-Hamilton 1936). "These animals were seen in greater numbers by tourists in 1936 than in any previous season. They seem to be losing their shyness, and are found more often near the roads than formerly. They have spread all over the Sections of the Park north of the Olifants River and are encountered equally in Nos. 6, 7 and 8 Sections. The increase of the elephant, which is of course an animal free from enemies except man, is more rapid than is generally believed. The gestation period is 22 months, and in a strictly unfettered state where there is plenty of space to roam and abundance of natural food, it is believed that the cows calve every two years or so, and that a female in her lifetime will produce a dozen or so calves, there is however no doubt some natural check to over-population such as infant mortality. Elephant calves in captivity are well known to be very delicate. Elephants are addicted to mopani forest where such exists, and this largely explains their preference for the northern portions of the Park. They are seldom encountered far south of the Olifants River except where mopani belts extend.

"There are now approximately 250 elephants most of the time in the Park as against an estimated 25 in 1912 and 0 in 1902".

(Stevenson-Hamilton 1937). "These animals have now spread all over Nos. 6, 7 and 8 sections, and are found permanently along both banks of the Olifants River, stragglers having ventured south to within 7 miles of Satara, and for nearly 30 miles up the Imbabate River. As regards vegetation however it must be admitted that the damage they do is almost unbelievable, as much in what they almost wantonly destroy as in what they kill in order to eat. Since elephants have increased and spread over the northern portions of the Park, they have destroyed many of the fine palm trees - some nearly 100 feet high - which used to grow on the swampy flats near the Shingwedsi and Letaba Rivers. The object is to get at the bunches of nuts growing at the crowns. An elephant will push down a large tree merely to pluck a few shoots from near the top or to get at a small piece of ivy growing on it, the latter being a favourite delicacy. No doubt this is one of Nature's methods of curtailing the otherwise too dense tree growth in a forest country. But where a herd of elephants has passed some time the bush looks as though a cyclone had passed through it.

"Since unrestricted shooting of elephants has been going on in Portuguese East Africa (about 12 months now), no doubt a great many animals have crossed into the Park, and I should estimate that the number here now must be at least 400. It is easy to distinguish these new comers from the old residents, since the smallest whiff

of human scent is enough to send them off at once in panic".

(Stevenson-Hamilton 1938). "Owing to the abundance of food and water away from the rivers due to the heavy April rains which fell in the Olifants and Letaba areas, the elephants did not, during the winter, congregate much near these rivers, but were scattered through the bush. They were therefore not so easily or so often seen by visitors as in 1937.

"They are however spreading rapidly over the whole Park north of the Olifants River and are fast increasing in numbers. On the eastern border of No. 8 section around the Mnyonga pools the ranger reports the whole country to be a mass of elephant spoor. The dense bush here on both sides of the frontier and the entire absence of any human habitation on the Portuguese side make it an ideal retreat for the animals.

"The main breeding herds are elsewhere largely confined to the area between the Olifants and Letaba Rivers from some miles west of the tourist road to the western boundary of the Park.

"The herds of females and young ones are very nervous and suspicious, and keep far from all highways and human habitations; the parties of bachelor bulls, young and old, on the other hand, wander far and wide, and display no fear of, nor hostility towards motor traffic".

(Stevenson-Hamilton 1939). "Elephants are increasing, and are now spread all over most of the 4 northern sections.

They are nearly always to be seen along the Shingwedsi River and its tributaries, as well as along the Olifants and Letaba Rivers, and nearly up to Punda Maria. Tracks of a single bull were seen in early November on the road only a few miles north of Satara, and they travel up the Imbabate at least as far as Chalons (following the mopani belt). The breeding herds confine themselves mainly to the area between the Letaba and Olifants Rivers above the respective causeways.

"Owing to the destruction by the summer floods of many of the large shade trees under which they liked to stand during the heat of the day, the small groups of bull elephants were less in evidence near the Olifants causeway than in recent years".

(Stevenson-Hamilton 1940). "The year has seen a wide expansion and a considerable increase of these animals. They are now encountered all over the four northern sections and have penetrated south as far as Isweni where at the end of the winter two bulls appeared near the W.N.L.A. compound where they tore down a notice board.

"Unfortunately a distinct migrating tendency westwards, at present confined to solitary bulls, is becoming apparent.

"Much damage is of course done to mopani and palm forest but in the former case this is certainly beneficial in keeping in check that extreme density of forest which inhibits the free growth of grass, while in the latter case it is beyond dispute that the elephants by their distribution far and wide of the undigested seeds of the palm fruit are the most potent factors in encouraging the spread of the various species which produce fruit eaten by them.

Also having passed through one piece of forest and left a track like a tornado behind a herd seldom visits the same spot until a considerable time has passed, and it is remarkable to see how quickly an area apparently completely devastated regains its natural appearance.

"The experience from other parts of Africa shows that it is the large herds of females and young ones which do

the real damage, once they have penetrated into cultivated area. This, in Uganda and elsewhere, has necessitated a system of 'elephant control' outside certain specified tracts of country. At first the scheme of allowing members of the public to shoot the elephant was tried, the administration taking half the ivory. This led, however, to all sorts of difficulties, and of course large numbers of elephants escaped wounded. Eventually only experts paid by government were employed and the whole of the profit on each elephant went to government funds.

"It is, however, likely to be a good many years before such a problem will have to be tackled in the Transvaal low-veld, and in the meantime I think shooting at raiding elephants by amateurs should be discouraged and the use of such other means as may suggest themselves, such as rockets, Veri lights etc., suggested against the solitary or pairs of bulls which so far are all that have to be contended against".

(Stevenson-Hamilton 1941). "The year was characterised by a great increase and local expansion of the elephant population of the Park. This no doubt is partly attributable to numerical increase by normal breeding, but also in considerable measure to the extensive hunting of elephants by natives which has, for some time past been legalised in portions of Portuguese territory adjoining the Park, and has resulted in a steady immigration from that country into the latter.

"During the year there became evident a tendency among the elephant population to move southwards as well as westwards. Up to 1940 lone bulls had seldom been reported even as far south as Satara, and then only during the marula season. Early in 1941 however, they began, singly or in small groups, to be seen in the vicinity of Tshokwane, and by mid winter had become more or less settled along the Manzemntondo River, with excursions as far south as the Mutlumubi River, 7 miles north from Skukuza.

"In September, possibly for the first time within nearly 100 years, elephants crossed the Sabi River to the south, and for some time about six of them were present near the Matamiri Spruit where it joins the Sabi about 19 miles from Skukuza. Here they were seen on several occasions by tourists. With the advent of rain towards the end of the year these animals seem to have returned northwards. Perhaps the prolonged drought which prevailed throughout the whole of the Olifants and Letaba areas for the first 11 months of the year, tended to decrease the food supply, and forced these small parties of bulls to seek a living farther afield. The dense wait-a-bit thorn bush characteristic of so much of the country along the south bank of the Sabi is probably less attractive to them than the more open veld with its numerous marula trees, palms and mopani forest in the north.

"Nevertheless, especially should the present and immediately following years be deficient in rainfall through the northern sections of the Park, there may be expected a further southern infiltration of small parties of (mainly) bull elephants especially during the autumn and winter months.

"On the other hand, should there occur heavy rainfalls, with consequently, plenty of food available, one may anticipate less tendency on the part of the animals to migrate from what are obviously their favourite habitats along the various rivers from the Olifants northwards. Further, if through lack of ammunition or other causes, the present killing of elephants by natives in P.E.A. should cease or diminish, there is a likelihood of a cessation of further emigration, and even a considerable return on the part of some of the herds to that country,

which is throughout a large portion, very suitable to their habits".

(Stevenson-Hamilton 1942). "There was no further movement of elephants southwards from the Sabi River during the year. Ranger McDonald reported that those which were noticed in the vicinity of Gomondwane towards the end of 1941 had recrossed the Sabi to the north. Subsequent to the November rains in 1942 all the elephants apparently left the Sabi and returned northwards. A tour round the boundaries of No. 3 section from Crocodile Bridge via Lower Sabi to Skukuza by the Warden at the end of December revealed no recent traces of elephants, and such spoor as was noticed was at least two months old. Ranger Steyn also observed the tendency to trek north. It seems clear that the considerable southward movement from the Olifants and Letaba areas noticed in 1940-41 was primarily due to the drought conditions and consequent shortage of food in the favourite feeding grounds. Nevertheless, the trail having been "blazed" there is no doubt that elephants will at certain times of the year and under certain conditions continue to find their way at least as far as the Sabi River, where food conditions are good along the banks and on the islands.

"A single young male, apparently evicted from his herd, took up permanent quarters on the Sabi River from 2-10 miles east of Skukuza, and remained in that area from May until about mid-November. This animal was seen by many visitors during the season.

"Elephants, probably coming from the Imbabate River near the western boundary of No. 5 Section, where they have been localised for many years, appeared in the vicinity of Kumane, 16 miles south of Satara, but seemingly did not move east of the main road.

"It is the habit of elephants, like other wild animals, to frequent the neighbourhood of the larger rivers during the dry season, but after the fall of the first rains to spread themselves over the country, relying for water on the numerous bush pools and spruits which are dry in winter. It has thus happened in the past that the period of elephant assembly near the Letaba and Shingwedzi Rivers coincided with that during which the local camps were occupied by tourists. The lights, the noise and the scent of human beings evidently combined to deter the animals from venturing into the camps, and in consequence no instances occurred of the fences being broken or damaged, or of any attempted intrusions at such times. The dry period intervening between the departure of the visitors in October, and the signal for the annual migration of the elephants from the rivers, was usually so limited that the animals had no time to grasp and take advantage of the new conditions, and therefore the damage done was always quite minor and sporadic.

"The deserted state of the camps, during the whole of the dry season of 1942, however, encouraged a different attitude among the elephants, who were quick to take advantage of the absence of any large number of human beings. Very early in the winter individual bulls began to walk through the fences both at Letaba and to a lesser degree at Shingwedzi, the chief attraction to them being the large mlala palm trees which formed such an ornament to both camps, from which they chiefly coveted the nuts found growing on the crowns.

"Since the depredations always took place at night, it was most difficult to cope with them. The number of elephants visiting Letaba camp gradually increased, and it suffered in consequence more than Shingwedzi. Ranger Crous tried every method, short of using a rifle, that he could think of; firing at them with a shotgun,

using flares, etc., but with no more than temporary effect. Nor is it probable that where, as at Letaba a considerable number of animals were involved, all or nearly all of them solitary bulls working alone, the shooting of one or two would have had any lasting effect. Within 3 months the larger palms in the camp had been destroyed, as well as all the smaller trees of such other types as were of any interest to the elephants. The camp fence was almost entirely flattened, throughout. The larger forest trees growing in the enclosure were too big to be tackled successfully, and so were left alone; no damage whatever was done to the rest huts or other buildings, nor in fact to anything except such items as furnished a source of food.

"At Shingwedsi the damage was confined in great measure to the acts of one large solitary bull, which also showed itself dangerous by chasing natives in the camp even in daytime, and in establishing something like a reign of terror, as he never moved away from the immediate neighbourhood of the fence. Instructions were therefore given for the killing of this animal, and were duly carried out by Ranger Tomlinson, who sat up for and shot it in the tourist camp, close to the camp officer's quarters, one night late in August. Not much damage accrued afterwards to the camp, and the palms therein had escaped extensive harm.

"It had been decided by the Board to experiment with an electric fence such as is in use at Addo Bush at the Letaba camp; but seeing that everything there which is likely to suffer had already been destroyed, it was agreed that it should be put up at Shingwedsi.

"It is understood that the shooting of elephants which was undertaken under government auspices in Portuguese Africa adjoining the Park, some years ago, and resulted in a considerable influx of these animals to the latter, has ceased for the past 12 months or more, and in consequence it is unlikely that there will be much more emigration westwards from that territory, where, especially in the north, there are very large expanses of suitable elephant country.

(Stevenson-Hamilton 1943). "Only a few straggling bull elephants are reported to have made their way south of the Sabi River. Two of these seem to have wandered as far as the Crocodile, towards the end of winter, as their spoor was seen by a native ranger patrol of No. 2 Section. Ranger James at once proceeded thither, and followed the tracks, which however led north and in fact the animals seem to have made straight for and crossed the Sabi, as about that time two bulls were known by their spoor to have passed close by Skukuza station during the night and crossed the Sabi to the north. No elephant remained, as last year, on the Lower Sabi road near Skukuza, and only 3 or 4 were reported in the winter near Lower Sabi and Gomondwane bush. Some appear to remain permanently along the Manzemntondo River, which is favourable country; but generally speaking the tendency is to return northwards towards the favourite mopani country immediately after the first rains have fallen, and the southward emigration in search of food seems to take place only in winter when conditions along the Olifants and Letaba become difficult for the animals.

"There are large herds along the Olifants River between the Imbabate and Hlalulume".

(Stevenson-Hamilton 1944). "Largely, no doubt, owing to the prolonged drought, elephants have been spreading themselves far and wide in search of food. Small troops of cows and calves have even been seen so far south as the Sabi River. Only isolated or pairs of bulls have ventured to the region of the Crocodile River and have never remained there, possibly because conditions are less tempting to them than further north where river

banks are more abundantly clad. The rangers of Nos. 7 and 8 sections have been instructed to keep a strict watch and to destroy or scare any animals which may be found trying to cross out of the Park southwards.

(Stevenson-Hamilton 1945). "Drought conditions have favoured spreading of small knots of elephants over most of the Park. A group of 5 bulls is often present along the Mbeamide River, and sometimes moves southwards to the Crocodile, though it has not so far remained long in that vicinity. There are always a few present at Lower Sabi and Gomondwane. The tracks of one or two have been noticed as far West as Doispan.

"Ranger Crous reported a herd of about 70 with young calves at the river opposite Letaba Rest Camp. They are now nearly always to be found along the Pafuri River North of Punda Maria".

(Sandenbergh 1946). "With the exception of the South Western two thirds of Pretorius Kop area elephant are now well established throughout the Park. There is a good concentration of approximately 40 on the Crocodile River between the Mbeyamide River and Malelane. Five have been seen off and on for the last seven months on the Sabi River opposite Doispan.

"A rough estimate places their numbers at between 400 and 500".

(Sandenbergh 1947). "Elephant have continued their southerly movement and I am now convinced that they are firmly established in the south of the Park. During the year one was seen on the Little Faai in the Pretorius Kop area and, I think, one could reasonably expect them to be seen in most sections of the Pretorius Kop area within the next three years.

"South of the Sabi River I estimate the strength of elephants during 1947 to have been between 80 and 100; throughout all other sections of the Park elephant have been seen off and on throughout the year and an estimate I made during August leads me to believe that their numbers have now increased to nearer 600 than 500. There is no doubt that quite a few elephant came in from Portuguese territory - where the shooting of elephants has been going on throughout the year. The increase has also been good and we can expect elephant to break out to the West in fair numbers within the next few years. It is, of course, very difficult to say how many head of elephant the Park can carry but the fact remains that if they continue to increase, the time will come when the Park will not be able to support all the elephant in it and they will start leaving the Park in search of food".

(Sandenbergh 1948). "It would appear that elephant are increasing at quite a normal rate and that they are now very firmly established right down to the Crocodile River. They remained scattered rather late this year and appeared to be herding only as from July - this is most probably due to the fact that in the early part of the year the water distribution in the Park was better than usual.

"From information received from Portuguese territory, a considerable number of elephant were killed during the winter in areas not far removed from the Park, and as these areas are rapidly being denuded of elephant the result will be that we cannot expect to receive any major additions from that territory".

(Sandenbergh 1949). "It is my opinion that the Park is not yet fully stocked with elephant, but there surely will come a time when it will be, and set as it is, within a developed area, elephant will endeavour to break out from time to time. I believe, therefore, that whenever elephants break out with any determination from the Park, the wisest policy would be to have the animals in question killed. It would appear that, if left alone, these marauders

return to encourage others to go out with them".

(Sandenbergh 1950). "Elephants are well established and increasing. Towards the end of the year there was a noticeable falling off in condition. This was quite normal in view of the drought conditions. The breeding rate appears to be well maintained and quite normal.

"During the year, for the first time, it has been definitely established that cows and calves have established themselves in the area South of the Sabi.

"The Pretorius Kop area, proper, was not visited this year, otherwise these animals can be found anywhere in the Park.

"In August, at the request of the Provincial Administration Park officials assisted in clearing the Blyde River area. Seven bulls were destroyed and the remainder trekked out, apparently to the Olifants River basin. No cows were seen in this area.

"In September elephants began breaking out over the Crocodile River and causing damage to European farms. Park staff destroyed seven bulls (six of which had previously been wounded by persons unknown). The remainder were driven from this valley. During the course of these operations it was established that there had been 40 to 44 bull elephants in the Crocodile basin. No cows were discovered. From the time of this operation no further trouble has been experienced.

From 1952 onwards, KNP reports were written in Afrikaans. For the purposes of this thesis, I have translated them into English. Any further text blocks in italics in this chapter have been translated.

(Raad van Kuratore vir Nasionale Parke. 1952). *"Two bulls which had been causing damage to crops were shot in March on the Shangani boundary. One of the bulls tusks weighed 87 and 76 pounds.*

"Another bull was shot in May on Malelane Section after all possible methods of discouragement had been tried.

"So called "pilot bulls" ("spioenbulle" in Afrikaans) continued their history of dispersal into the South. Three bulls were seen at the famous hippo pool in the Pretoriuskop area and two (possibly three) crossed the western (Numbi) boundary at Mtimba. They soon returned to the Park after their reconnaissance".

(Steyn, L.B. 1955). *"For the Board's information and with a view to developments inside and across the Park's boundaries, I think that it would be useful and informative to give a short history of the distribution of elephants as observed by the Ranger Staff. The section of the report concerning the area to the north of the Olifants River has been prepared by Senior Ranger Rowland-Jones (see below) while that to the south has been drawn up by me.*

"Elephants were seldom seen to the South of the Olifants River before 1938, but the start of the penetration from the north was observed that year, led by "pilot bulls", which took them to the southern and across the western boundary. There are signs that even south of the Sabie the distribution towards the west is continuing.

"Elephant breeding herds established themselves throughout the area between the Olifants and Crocodile rivers between 1938 and 1944 and they are apparently established throughout the Kruger National Park".

"When this dispersal began in 1938, the population of the KNP was estimated at 244, all north of the Olifants

River. According to the most recent game counts of 1954 the total is now 560 north of the Olifants and 180 to the south thereof, a total of 740 which represents an increase of 500 in the whole park over a period of 17 years.

1938-40: "The first penetration southward from the area between the Olifants and Letaba rivers into the Satara Section occurred during this period. Without even establishing themselves here first the dispersal continued south into the Tshokwane Section and the two Sections were colonised simultaneously.

1940: "Two bulls were recorded for the first time on the Esweni River near the Lebombos in June.

1941: "Bulls spread south of the Esweni and have increased to six. This dispersal occurred from the north along the Lebombos to Saliji in June and later to cross the Sabie in September 1941. In November, the first cows with oldish calves were seen in the Manzentondo River. In the mean time, bulls spread all over the area between the Olifants and Sabie rivers.

1942: "By May there was large herd of about 25 elephants in the area to the north-east of Tshokwane and in June a cow with a small calf (which must have been born in the area) was seen in the Manzentondo north west of Tshokwane. By the end of the year, a breeding herd of 35 were counted in this area and became permanently established on the Tshokwane Section. A herd of 12 established themselves in the Sabie River during the year wherefrom they spread to the Ngomondwane in the Crocodile Bridge area.

1943: "While the herd of 12 moved westwards from the Crocodile Bridge area into the Malelane Section, a gradual increase occurred in the area to the south of the Olifants River. No records were kept of the routes or numbers after this but from 1944 onwards elephants were permanently established south of the Sabie River. The numbers stayed reasonably low in contrast to the Area between the Sabie and Olifants rivers. Thirteen elephants were destroyed along the Crocodile River however for control purposes between 1946 and 1954. There are now an estimated 25 according to the most recent counts.

1944-45: "During the past ten years the elephant population increased steadily in the central areas and their numbers are now estimated at 255 while in the north they are estimated at 560.

Once the whole Park had been colonised, movements began to occur over the eastern and western boundaries. Before 1946 there were already forays over the eastern boundary between the Olifants and Sabie rivers and control of these miscreants had been initiated and of course still continues (but now by the Provincial Administration).

1946: "Control of elephants which crossed the Crocodile River began in 1946 and has continued sporadically since. Dispersal over the western boundary between the Sabie and Crocodile rivers has not yet developed to any significant degree but the signs are that things are gradually developing in this direction".

(Rowland-Jones 1955). "During the summer months of 1946, 47 and 48 after the first good rains a yearly migration occurred from Malonga to Kloppefontein and the area north of that to the Levubu, and it was not until 1949-

50 that elephant took up permanent residence there. Again the reason was drought, the Wambia pans and others along the eastern boundary were completely dry.

"In 1951 the elephant had crossed the Park to the western boundary and the first scouts appeared in the native locations to the west.

"Meanwhile the elephant population at Shingwidzi increased at the same rate, the portion north of the river being fed by elephant movement down the Pongola river to the Shingwidzi, as the upper pools dried off.

"As these elephant became more and more permanent residents, Pafuri became a favourite winter resort with its permanent river water supply, but the population there varies yearly according to the rainfall. In my opinion there has been only a very small influx from Rhodesia as elephant from there mainly come down to the Limpopo during the dry months and re-cross after the first good rains.

"In 1952 the breeding herd at Punda Maria moved down the Pongola river as far as the Shingwidzi and since that period its habitat has been the Pukwane-Pongola-Shingwidzi block. This is still the only herd of any size which moves as far west as the Shangoni section and on the remainder of that area only a few bulls and an occasional cow are to be found.

"Meanwhile in the Shangoni area the first penetration had commenced. A limited number of elephants have been shot by Fauna and Flora in these areas, but the crucial fact emerges that in no case had the original pathfinder elephant been shot, so the path was laid for others. Now that this elephant raiding of native lands has developed into a normal summer routine on the part of the elephants, it will require a major operation to stop this and it is improbable that even the most stringent measures will leave a 100% effect.

(Steyn 1958). *"A bull and a cow with a small calf were seen for the first time in the south-western corner of the Pretoriuskop Section, and when these animals establish permanent residence there, elephants will have dispersed and become established throughout the Park.*

"Larger and larger breeding herds are moving south from the Olifants River area and a trustworthy lorry driver counted a herd of 65 along the Lower Sabie road. This herd, which last year came only as far south as the Sabie River, now spends its time between the Sabie and Crocodile rivers.

"Respective estimates by the Rangers of the Park's elephant population are as follows:

"1938 - 244; 1954 - 740; 1957 - 1,355 ("With due respect for possible errors, a conservative total of 1 000 is considered appropriate).

"The question of whether or not the time is rapidly approaching that the tremendous increase of this species should be internally controlled is receiving attention and a meeting of the Nature Conservation Department on the subject was held on 15 March". (No record of the decisions taken at this meeting could be traced).

(Pienaar 1958). *"The Letaba Section is still the heart of the elephant territory and centre of population recruitment. A total of between 450 and 500 is likely the maximum occurring in the area.*

"The Shingwedzi Section has two main herds totalling 140 -145 elephants. The Shangoni Section has approximately 75, and Punda Maria Section possibly no more than 80. The total for the north is set at 650 - 700.

"The Central Region has little proper elephant habitat, resulting in a smaller elephant population of about 120 of which 75 occupy the Satara and Kingfisherspruit. Tshokwane Section carries barely more than 45.

"The total population south of the Sabie River totals around 75 of which there are 45 in the Crocodile Bridge, 10 in the Malelane, and 20 in the Pretoriuskop sections respectively. A large majority of these are bulls.

"A calf was born on the Crocodile River in October and another was reported from the Crocodile Bridge Section after the rains. It would thus appear that elephants have finally re-established themselves in this area where they were driven to extinction by man in the 1850's".

(Biologiese Afdeling, Jaarverslag 1959). *"At the beginning of May the elephants returned to Pafuri. These included three bulls and a herd of 25 which caused considerable damage in the fever tree forest, but moved off after the first summer rains. The aloes (*A. marlothi*) at Doispans and also along the Sabie River were almost completely eradicated by a herd of elephants".*

(Brynard en Pienaar 1960). *"During March this year during an aerial survey of *Quelia* breeding colonies, elephants were also counted. A total of 986 were counted of which 2 were recorded in the Southern, 261 in the Central and 723 in the Northern Regions respectively. The Southern Region was not covered adequately yet the impression gained was that during the summer months, only a small percentage of the elephant population is permanently in the area".*

(Biologiese Afdeling 1961). *"During the most recent winter season, a large scale southward movement of Tshokwane's elephant herds took place, and the animals stayed along the Sabie River until deep in October. Large numbers of breeding herds were seen during flights in a light aircraft over the northern regions during the anthrax campaign. The herds move over large areas in the north, splintering and then rejoining and as a result, no reasonable estimate of the population could be gained from the totals as it can be expected that several herds were repeatedly seen at different localities.*

(Natuurbevaringsafdeling Jaarverslag 1962). *"Although the proposed aerial census of elephants had unfortunately to be postponed again, aerial surveys to search for *Queleas* were conducted in especially the northern areas. In these areas a total of 597 elephants were counted. Due to the prevailing widespread distribution of water, conditions were not particularly favourable for a proper survey of this type.*

"Elephants entered the Pafuri area in larger numbers than ever from the middle of May until the end of June this year. At one stage there were no less than 33 counted at the Picnic Place and two smaller groups at Bobomene. Strangely enough the vegetation (especially Fever Trees) were not so severely damaged as in previous years. After the first good summer rains, the animals again left the area as usual".

(Natuurbevaringsjaarverslag 1964). *"The aerial census of elephants which has been eagerly anticipated for so many years was finally successfully conducted this year during the first week in August with the aid of a helicopter. The helicopter proved ideal for this purpose. The eventual census total of 2 374 is considered to be a minimum total which is thought very close to the actual total. It can be accepted as fact that the increase on the population of 624 over a period of slightly more than two years creates a completely false impression and does not represent the result of natural increase, but rather on a drastically improved census technique. Immigration from Portuguese East Africa either temporary or of a more permanent nature, could also have*

contributed to the increased total. In March it was seen how two herds of elephants of 42 and 34 respectively entered the Park near the Kalabyene Spruit in the Lebombos. It is very possible that due to the tremendous drought large numbers of elephants (eg the 110 which were recorded at Pafuri during the census) came in search of haven in the Park from the sandveld regions of P.E.A.

"According to a life-table constructed from the aerial census data, it was calculated that the present number of elephants, if allowed to increase undisturbed at the present rate, could double in the next 20 years.

(Natuurbeawaringsjaarverslag 1967). *"A total of 6 586 elephants were counted during the aerial census of 1967, of which 362 were recorded south of the Sabie River, 1 482 in the Central District, and 4692 in the Northern District. These totals represent an increase of 2 374 on the 1964 census total which can not be attributed to reproduction. It is believed that the increase is mainly attributable to immigration from Mozambique as a result of the unfavourable conditions there. The possibility existed that many of these immigrants would return to Mozambique after the rains. A second aerial census conducted at the end of the rainy season in March revealed however that the majority of the elephants that came into the Park were still here, and it would seem that they are here to stay. The March census total was 6 093 inside the Park with another 309 in the border strip in Mozambique. Further, it would appear that the old pristine elephant habitats between the Limpopo and Olifants rivers in Mozambique are currently fast becoming inaccessible to elephants, particularly the breeding herds. The possibility of large numbers of elephant emigrating to Mozambique during future high rainfall years seems remote, and the large residential herds in the Park are now beginning to create serious problems"*

The summaries from the respective annual reports subsequent to 1968 have not been included here as these include much irrelevant detail. Also, the subsequent annual aerial census reports contain most of the information on population trends which will receive more attention in Chapter 5 (The Elephant Management Era).

The increase in the population given in the above reports and up to 1967 are summarised in Table 4 along with the nature of the estimate and the source reference.

It is clear from this that the increase between the years 1960 and 1967 can not be due to biological increase alone. It is likely that the estimated totals prior to 1967 were under-estimates and that the first aerial census yielded a result much closer to the actual figure, suggesting the apparent massive increase over this period. It is unlikely that any of the estimates prior to 1967 have any real value compared with the latter ones using aerial census techniques. A second curve has been fitted to the graph by eye which is likely to resemble the actual population increase more closely. This would

reflect biological increase and immigration from the neighbouring territories (Zimbabwe (Rhodesia) and Mozambique) as well.

Table 4: Estimates of numbers of elephants in the Kruger National Park from 1903-1967.

Year	Number	Nature of estimate	Source
1903	0	Estimate	Stevenson-Hamilton (1903a, 1903b)
1905	10	Estimate	Stevenson-Hamilton (1905)
1908	25	Estimate	Stevenson-Hamilton (1909b)
1925	100	Estimate	Stevenson-Hamilton (1925)
1931	135	Estimate	c.f. Pienaar, van Wyk & Fairall (1966)
1932	170	Estimate	Stevenson-Hamilton (1932)
1933	200	Estimate	Stevenson-Hamilton (1933)
1936	250	Estimate	Stevenson-Hamilton (1936)
1937	400	Estimate	Stevenson-Hamilton (1937)
1946	450	Estimate	Sandenberg (1946)
1947	560	Estimate	c.f. Pienaar, van Wyk & Fairall (1966)
1954	740	Estimate	Steyn (1958)
1957	1 000	Estimate	Steyn (1958)
1960	1 186	Aerial survey	c.f. Pienaar, van Wyk & Fairall (1966)
1962	1 750	Fixed-wing survey	Pienaar (1963)
1964	2 374	Helicopter count *	Pienaar, van Wyk & Fairall (1966)
1967	6 586	Helicopter count *	Pienaar (1967)

Another possible explanation for the sudden increase in the KNP population between 1964 and 1967 is that an exodus occurred then from these neighbouring countries into the KNP. However, we have no other evidence (e.g. an increase in poaching or the advent of civil war in these countries) to substantiate this postulation.

In 1967, annual aerial censusing of the population as well as population control (culling) were initiated. This signalled the start of the “Management era” during which the policy was to hold the population at a level of around 7 000. This era is covered in Chapter 5.

RATE OF RECOLONISATION OF KRUGER NATIONAL PARK BY ELEPHANTS

The pattern of recolonisation of the KNP by elephants subsequent to 1903 (when there were no elephants) and up to 1958 (when they had finally been recorded throughout the area) is shown in Figure 10. These data and localities were derived from the reports of the earlier rangers and wardens given above. Dates and places were given in these reports, but it is impossible to infer the exact localities that such observations were made. For example, "Tshokwane" could mean anywhere on the ranger's Section named Tshokwane, or it could mean at the ranger's actual quarters. For the purposes of the present analysis the localities were assumed to be the actual places of the name given in the reports. Distances between these localities where elephants were first recorded were measured as straight-line distances on a 1:250 000 map. The recolonisation process is presented in three ways. The first is simply based on the time taken to spread from the point of origin (roughly midway between the Park's northern and southern boundaries) to the northern and southern extremities of the KNP. Northward to the Luvuvhu River (which was the northern border of KNP at the time) took until 1945 (40 years to cover the 292 km distance at a mean rate of 7.3 km/year) while the spread southward to the confluence of the Crocodile and Sigaas rivers, was slightly slower, taking until 1958 (53 years to cover 280 kms at an average rate of 5.4 km/year). The mean dispersal rate (286 kms over a period of 46.5 years) was 6.2 kms/year or 0.16 yrs/km.

In Figure 11, the times and distances between the successive points where elephants were recorded for the first time were plotted. Table 5 summarises these data. The correlation between the two variables was poor, and the assumptions pertaining to the data points are such that a "least squares" estimate of correlation is invalid. The poor relationship suggests that the rate of dispersal was not a function of time, but rather that some other factor(s), such as habitat quality, may be more important in influencing in the recolonisation process.

In a third approach I recorded the straight-line distances between the point of origin and each successive point where elephants were first recorded. This shows that the spread through the KNP did not occur at a constant rate (Figure 12). Both northward and southward trends were sigmoidal. Northward, this acceleration occurred about ten years earlier than southward. Two of the data points (Pretoriuskop and Shangoni) do not fit this pattern, but both of these were points located far to the west of their respective preceding points. Pretoriuskop is west of

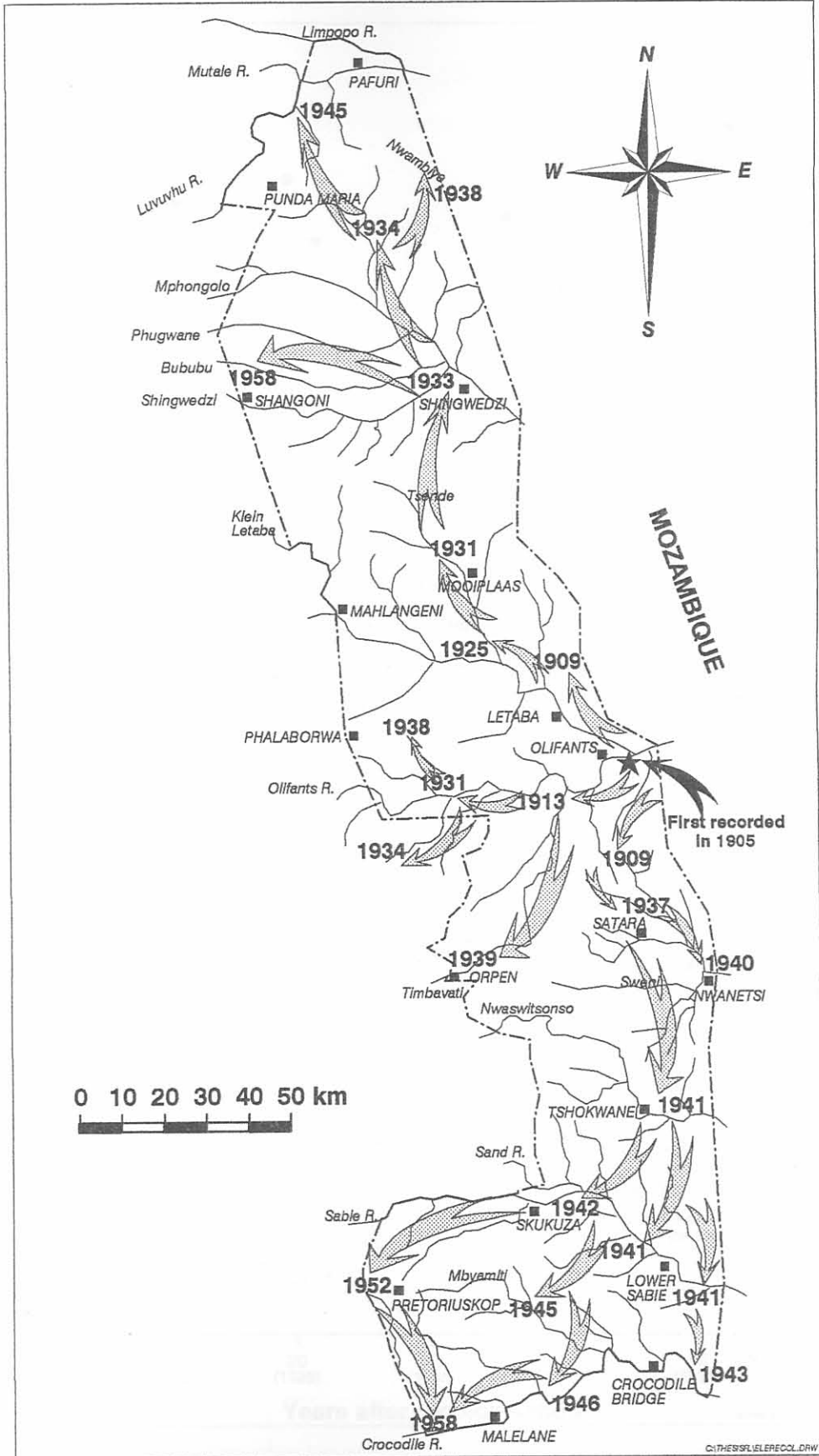


Figure 10: The recolonisation of the Kruger National Park by elephants subsequent to the arrival of the first Warden in 1903.

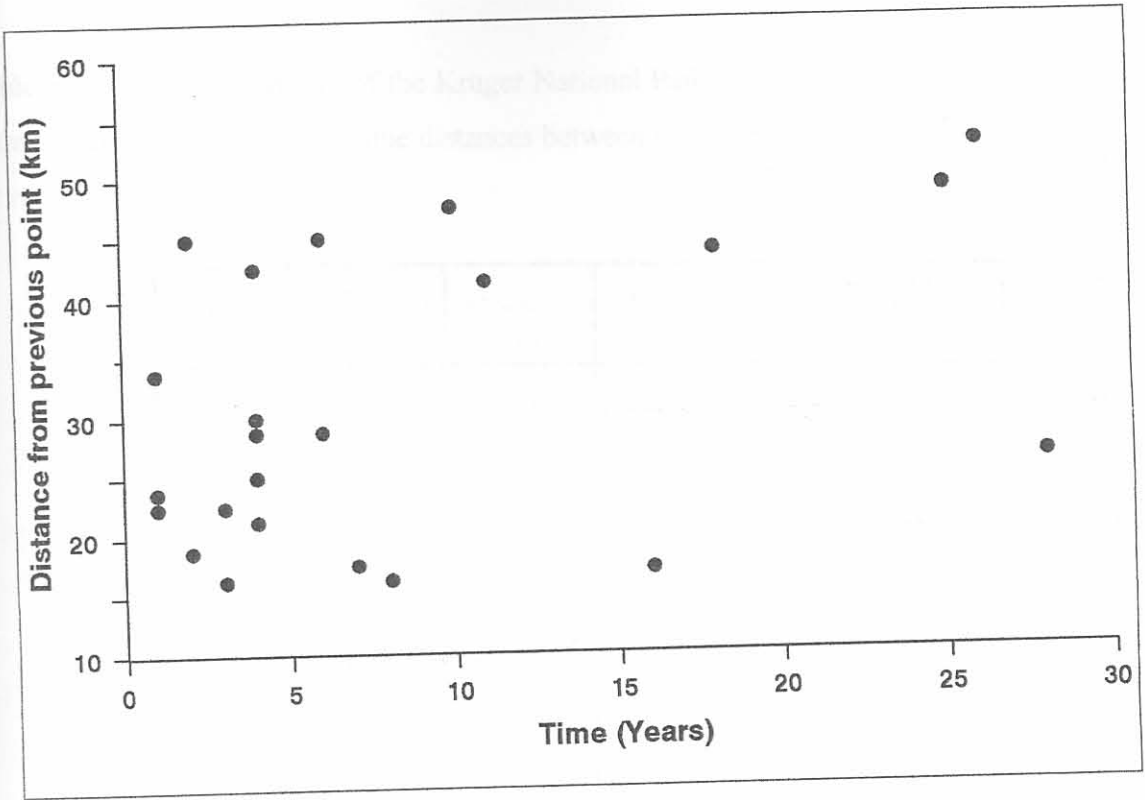


Figure 11: The relationship between time and the distance between successive points in the recolonisation of the Kruger National Park by elephants.

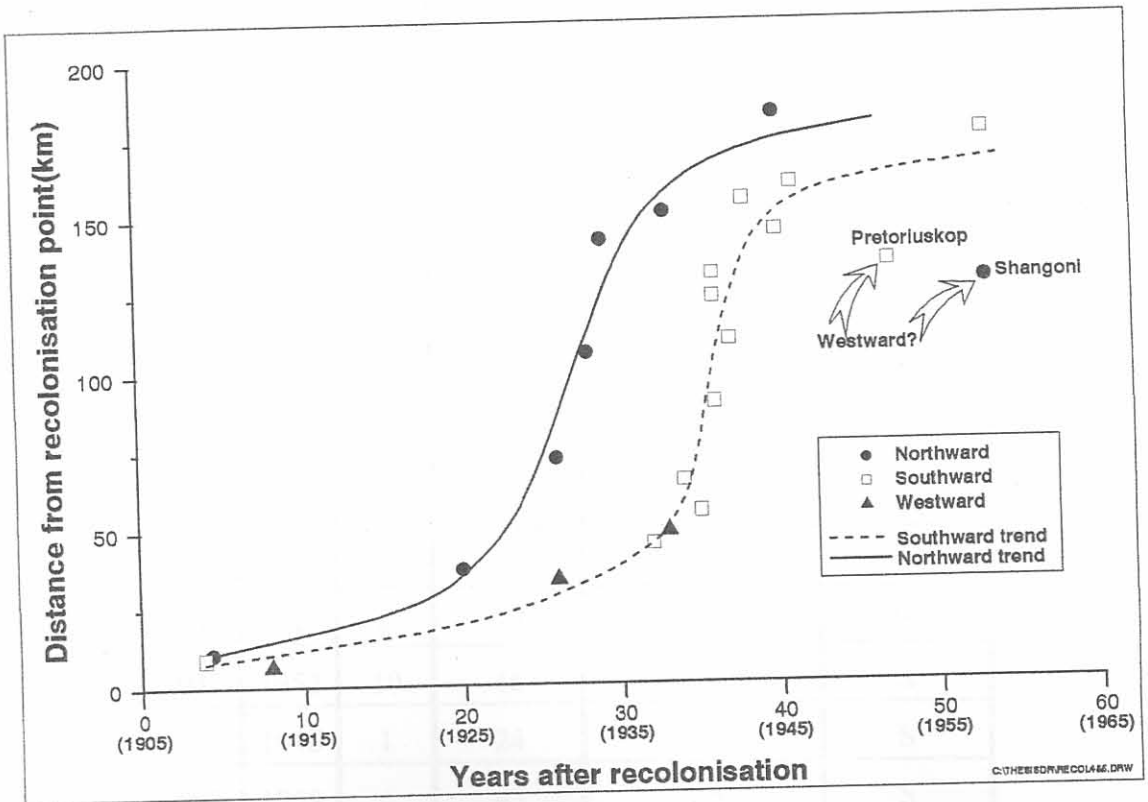


Figure 12: The rate of recolonisation of the Kruger National Park by elephants southward and northward between 1905 and 1908. The curves were fitted by eye and are based on data points illustrating the recolonisation process in Figure 10.

Table 5: Recolonisation rate of the Kruger National Park by elephants between 1905 and 1958. Distances given are the straight-line distances between the successive points where elephants were first recorded.

Start date	End date	Time (Yrs)	Distance (km)	Dispersal rate (km/year)	Direction
1905	1913	8	16	2.0	W
1913	1931	18	44	2.4	W
1931	1934	3	16	5.4	S
1931	1938	7	18	2.5	N
1905	1909	4	25	6.3	N
1909	1925	16	17	1.1	N
1925	1931	6	29	4.8	N
1931	1933	2	45	22.5	N
1933	1958	25	49	1.99	W
1933	1934	1	34	33.8	N
1934	1938	4	29	7.2	N
1934	1945	11	41	3.8	N
1905	1909	4	21	5.3	S
1909	1937	28	26	0.9	S
1913	1939	26	53	2.0	S
1937	1940	3	23	7.5	S
1937	1941	4	43	10.6	S
1941	1942	1	23	22.5	S
1941	1943	2	19	9.4	S
1941	1945	4	30	7.5	W
1942	1952	10	48	4.8	S
1945	1946	1	24	23.8	S
1952	1958	6	45	7.5	S

Skukuza along the Sabie River and Shangoni is west of Shingwedzi on the Shingwedzi River. This suggests that spread along a major river may have been slower than the spread between rivers. This is what could be expected as the less abundant water and food resources away from major rivers would probably have necessitated faster movement.

A second reason for these two points being inconsistent with the rest may be that although the respective distances between them and the point of origin were measured as straight line distances, the movement actually occurred in two phases - south or north initially and then west. The actual distance covered would thus have been further and, if measured this way, would conform more closely to the pattern.

ELEPHANT MOVEMENT BETWEEN THE KNP AND MOZAMBIQUE PRIOR TO THE FENCING OF THE BORDER

During the 1960's there was a fairly large seasonal movement between the KNP and Mozambique. It was realised that the fencing of elephants would be a problem, particularly on the eastern borders of the KNP. It was reported (Natuurbevaringsjaarverslag 1967) that *"The large-scale movement of elephants between Portuguese East Africa and the Lebombo flats of the Klipkoppies Section was again confirmed during the winter months this year. The movement is of such dimensions and is so regular that a conventional fence in this area would prove useless"*.

This movement apparently resulted in a large influx of elephant from Mozambique sometime between the aerial censuses of 1964 and 1967 (see Natuurbevarings-jaarverslag 1967 above). Although it appeared that the majority of these animals had come to stay, there was still a limited movement across the border thereafter. In November 1970 an aerial survey was conducted in the area adjacent to the KNP in Mozambique in the triangle between the KNP in the west, the Limpopo River in the east and the Olifants River in the south (Joubert 1970). A total of 555 elephants was recorded and it was suggested (without substantiation) that a connection may exist between the elephant populations of the KNP, the Ghona-re-Zhou in Rhodesia (Zimbabwe) and the Save River in Mozambique. Another aerial survey was conducted in Mozambique in April 1972 in a strip 32 kms wide from the KNP's eastern boundary and between the Sabie River in the South and the Limpopo River in the north (Joubert 1972a). This time 789 elephants were recorded of which 120

occurred to the south of the Olifants River and the rest (669) to the north. Based on the distribution of elephants and the apparent lack of permanent water in this area, it was concluded that 10 - 15% of the KNP's elephant population moved into Mozambique during the wet summer months and returned as the waterholes dried up. Although it was known that elephants moved across this boundary, the number of animals involved was not. Joubert suggested that this movement was not detectable from the annual census data (as would be suggested by large fluctuations in the census total from year to year) as these elephants would have moved back into the KNP each year during the time of the census.

In 1974 the South African Government decided to fence the eastern boundary in its entirety and this was completed by March 1976. This fence is substantial enough to limit the large-scale movement of elephants. Although still occasionally broken by adult bulls, it has stopped movements between Mozambique and the KNP such as those reported earlier (Joubert 1972a; Natuurbewaringsjaarverslag 1967).

Agostini (1994) contended that during the fencing of the KNP's eastern boundary in 1976, helicopters were used to drive "Mozambique's" elephants into the KNP before the fence was closed. The pilots employed by the National Parks Board at the time (H. van Niekerk & P. Otto pers. comm.²) and also those involved with fence construction deny this categorically, as does Pienaar (In litt.) who was the Park Warden of KNP at the time. Analyses of KNP aerial census data from 1967 to 1996 (see Chapter 5) also do not support this contention as it shows that the mean annual rate of increase of the elephant population declined from 9.8% to 6.6% after the fencing of the eastern and northern borders was completed. This suggests that until the fence disrupted it, immigration into the KNP was still taking place, and that there is no evidence of a "drive" of large numbers of elephants into the KNP at that time.

The fence between KNP and the private nature reserves on the western boundary between the Sabie and Olifants rivers was removed in 1994 to allow free movement of game. As the fence along the Limpopo River denied animals access to water in the dry season, it required constant maintenance due to the many breakages it sustained, particularly from animals like elephants and

² H van Niekerk and P. Otto, South African National Parks, Skukuza, South Africa.

hippopotamuses. Maintenance of the fence was therefore suspended in the late 1980's and the remaining fencing material was finally removed in 1999.

THE HISTORICAL DEVELOPMENT OF THE CULLING POLICY

The artificial control of elephant numbers in the KNP had been discussed among staff as far back as at least the early 1940's. This is illustrated by an amusing excerpt which has been translated here from the diaries of one of the rangers of the time (Steyn 1942). *"With regard to the question of the control (culling) of elephants in certain areas where it may become necessary, the following idea came to mind, i.e. to use a 10 or 12 ton armoured car to remove them from any region. This will naturally only be possible after the present war and I leave the details to the imagination of the reader"*.

During the 1950's and early 1960's there was a growing feeling among some biologists in Africa that elephant numbers should be controlled to prevent habitat change. Beuchner *et al.* (1963) concluded that in Murchison Falls National Park (Uganda) 4.5 - 5.5 elephants/mile² was exceeding the carrying capacity and that "their numbers must be regulated to avoid damage to the vegetation and for the future welfare of the population of elephants". Similarly Glover (1963) felt that for Tsavo National Park (Kenya) "one elephant/mile² is apparently the highest stocking rate possible..." and that "If the habitat is to be preserved in its present form for all of the animals in the Park, then the numbers of elephants will have to be controlled".

These feelings were shared by the KNP's biologists who also felt that it may become necessary to limit elephant population growth in the KNP. This feeling was expressed by Pienaar (1960). *"The desirability of elephant control measures on a more general basis, which may become necessary in the near future, is a much more sensitive problem and will only be successfully solved after attention has been paid and information has been acquired regarding the actual numbers of elephant in the South, the number of breeding herds, herd composition, seasonal movements, as well as aspects such as how and where control should be applied"*. In conclusion Pienaar (1960) made (among others) the following recommendations regarding the management of the elephant population:-

1. *That the collection of the information mentioned above be regarded as a matter of urgency.*

- An aerial census was suggested as the best means of obtaining the information.*
2. *That in the light of the above information, an elephant population level be prescribed for the Southern District.*
 3. *That all surplus elephants be destroyed annually through culling operations - preferably in the boundary areas and with due respect for outstanding individuals.*
 4. *That during normal years, elephants be denied the strip along the Crocodile River as well as a belt along the western boundary.*
 5. *Quantitative culling be applied elsewhere with great caution, if necessary".*

On 30 November 1965 a symposium was convened in Pretoria by the National Parks Board of Trustees (hereafter referred to as "the Board") which many South African biologists of the time attended. The symposium focused on "over-protection". Papers delivered at this symposium were on General Principles (Knobel 1965), Ecological Regions of the KNP (Brynard 1965), Problem Areas (van Wyk 1965), Reproduction and Biological Control (Fairall 1965), Control by diseases and Parasites (van Niekerk 1965), Animals, Areas & populations, Desirability of Culling and Methods (Pienaar 1965), Byproducts (Labuschagne 1965) and Publicity (van der Merwe 1965). The recommendation of this conference to the Board was that the numbers of seven species be artificially controlled by means of culling. The species involved were elephant, buffalo, hippo, giraffe, wildebeest, zebra and impala (Raad van Kuratore vir Nasionale Parke 1967). At its next meeting the Board decided that the culling of these species should take place (National Parks Board of Curators 1966).

Reporting on the census results of 1964, Pienaar *et al.* (1966) concluded that "It would appear that theoretically a carrying capacity of 1 - 4 elephants per square mile, depending on the existing vegetation, available water supplies and size of the area, holds for the majority of elephant habitats in Africa", and van Wyk & Fairall (1969), from the results of their research on the impact of elephants on the vegetation of the KNP, concluded that "... the highest number of elephants which could be carried would be 0.75/mile² (i.e. 6 000 elephants) if the total destruction of the vulnerable areas near water is not to result".

Pienaar (1996) also stated that this coincided with results obtained during the first helicopter census

in 1964, "... 1 139 elephants occurred in the Letaba River and its main tributaries (namely the Ngwenyene, Tsende, Shipikane, Makhadzi and Mbyashishe). This was apparently the preferred habitat of these animals in which they stayed during the recolonisation years until they approached a natural saturation point before they, in ever increasing numbers, began to disperse northward and later southward... Because the recolonisation of the Letaba-Tsende area, which can be considered as prime elephant habitat, could occur without hinderance or human interference, it must be accepted that the elephant density per unit area during the continuing process of dispersal would give a very good indication of a self-imposed (ie natural) saturation level for elephants in this habitat. A planimetric calculation of the area of this original elephant homeland yielded an area of 1 030 mile² - that is one elephant per mile²".

From this and the findings reported by van Wyk & Fairall (1969), the Director of the National Parks Board (Mr Rocco Knobel) recommended to the Board at an ordinary meeting held on 17 June, 1968, that the recommendation contained in Annexure "B" of the agenda with respect to the culling of elephant and buffalo in the KNP be adopted. The Annexure read as follows: "Until the water provision program has been finalised in its entirety, both the elephant and buffalo populations of the KNP should be held at their current level...". At this time the latest estimate for the elephant population (1967 census) was 6 586. This recommendation was adopted by the Board. Although it is obscure when or for what reasons it was changed, this figure was later rounded to 7 000.

This then was the level (7 000) at which management attempted to hold the population. The policy was adhered to until 1995 when a moratorium was placed on culling heralding the post-management era, though the last culls took place in 1994. This era is covered in Chapter 6.